



Science News-Letter



The Weekly Summary of Current Science

EDITED BY WATSON DAVIS

Distributed for personal, school, club or library use only and publication of any portion is strictly prohibited.
Issued by SCIENCE SERVICE, Inc., 1918 Harford Ave., Baltimore, Md., and 21st and B Sts., Washington, D. C.

Vol. X
No. 292

SATURDAY, NOVEMBER 13, 1926

\$5 a year
10c. a copy

CHEMISTRY

First Enzyme Isolated

The isolation and crystallization of the first enzyme has been achieved by Dr. James B. Sumner, assistant professor of biological chemistry at the Cornell Medical College, Ithaca, N. Y. Success came only after a period of research covering nearly nine years. During a part of the time Dr. Sumner, was assisted by Dr. Viola A. Graham and by Dr. Charles V. No-back.

The enzyme isolated is known as urease and occurs in the jack bean, in the soy bean and in a great many kinds of bacteria. It has been found in the horse-shoe crab and in the lining of the stomach. Urease is important in the cycle of nitrogen because it converts the urea that is produced by animals into ammonium carbonate, which is used by the plant, usually after conversion to nitrates by bacteria.

Chemists have been attempting to purify enzymes for nearly a century, but up to the time of Dr. Sumner's discovery no enzyme had ever been prepared in pure condition and the chemical nature of enzymes was entirely unknown. Indeed, a prominent worker in this field, Dr. Richard Willstätter of Germany, recently declared that the enzymes belong to no known group of chemical substances.

An enzyme, the word meaning "in yeast," is a substance elaborated by plants, animals, or micro-organisms that accelerates chemical reactions without itself being used up in the process. In other words an enzyme is a catalyst. But the enzyme is a catalyst of a special sort. It is extremely unstable and of colloidal nature. These are the chief reasons why the isolation of an enzyme has been considered an almost impossible task. Enzymes are sometimes called ferments because they cause fermentations. Of the great number of enzymes found in living cells a few examples are: zymase, which is present in yeast and which is responsible for the alcoholic

ANTHROPOLOGY



LADY AND THE MAMMOTH. Dr. J. W. Gidley, paleontologist of the U. S. National Museum, studying the skull of a prehistoric woman which he found in Melbourne, Florida. The skull was lying with bones of ancient camels, horses, mammoths, and glyptodonts, and Dr. Gidley regards it as evidence that men existed in this country before the mammoths disappeared. Dr. Gidley is pointing to the teeth of the skull.

fermentation of saccharine liquids; rennin, which is obtained from the stomachs of calves and which is used in the manufacture of cheese; pepsin, which is present in the gastric juice and which digests meat; and thrombin, which is necessary for the coagulation of blood.

Urease has been prepared by Dr. Sumner as octahedral crystals that are slightly larger in diameter than human red blood corpuscles.

The isolation of urease has opened up new fields for research and is expected to aid in the solution of many problems of the chemistry of enzymes.

Science News-Letter, November 13, 1926

British financiers have accepted a 60-year contract to light Jerusalem.

A way of measuring the speed of the blood flow in the body has been devised.

GEOLOGY

The Earth Speaks to Man

By EDWARD W. BERRY

Dr. Berry is head of the Department of Geology of the Johns Hopkins University at Baltimore, Maryland, and is recognized as one of the foremost authorities on paleontology in America.

Geology is the autobiography of the earth. Its book of history is the rocks. It is true that some of the pages are obliterated and some of the chapters have not been unearthed, but geologists have now described many thousands of feet of sedimentary rocks with the remains of animals and plants preserved in them. These are the real documents of Evolution—a true record covering millions of years and had not biologists proposed Evolution, the geologists would have had to do so. It is not possible to tell adequately of the geological record in a short discussion. I can only say that it extends over a vast lapse of time, that in general it shows a constant progression from simplicity to complexity, and always a survival of those organisms that were most perfectly adapted to their several environments. For example, boneless animals long antedate vertebrates. Among the latter, fishes appeared ages before terrestrial animals, reptiles long precede mammals and the evolution of the last, like that of the higher or flowering plants, upon which that of mammals was so dependent was the latest and most rapid.

The remains of man, in the form of weapons and tools of stone, and more rarely actual bones, are the last to appear in the records of the rocks, but during the past fifty years the discovery and study of man's origin has progressed at a marvellous rate. We now know that human beings have peopled the earth for a period of at least five hundred thousand years. We see the evidence for some belief in a future life in the ceremonial burials of Mousterian times, at least fifty thousand years ago, and with the wonderful cave art of about

(Just turn the page)

The Earth Speaks to Man

(Continued from Page 97)

twenty thousand years ago, we have overwhelming evidence of a very considerable ritual, and capacity for self-expression.

As I read the testimony of the rocks there can be but one scientific explanation of its meaning. Consider the endless series of faunas and floras that have been uncovered, each slightly different in types and grouping from what was older or younger—the whole run through with the warp of relationship but with a never ending change in the woof with the progress of time. Either they are genetically related or we have to assume that a creator, by some act of destruction and of special creation thousands of times repeated, destroyed the whole organic world and re-created all the myriads of living forms. Not only so, but each new creation was so like the preceding that training is required to discriminate them, and the new models were created with vestigial and useless parts—reduced replicas of parts that were functional in their predecessors. I do not deny that Omnipotence could do this, but such a conclusion is not scientific, nor does it do credit to the Infinite.

Although much remains to be discovered, we now know enough to affirm most emphatically that man as well as all other animals and plants has had a long evolutionary history extending over tens of thousands, and in some cases millions of years. The evolution of man as an animal was completed long before written history was invented, his most astonishing evolution has been the latest and more rapid development of the intellect, and there seems to me to be no limit to the betterment of the race by the exercise of wisdom, altruism and idealism—that trinity of what might be called spiritual graces.

Science News-Letter, November 13, 1926

There are about 1,000,000 ground squirrels in Yellowstone Park.

Grafted skin is best taken from another part of the same individual.

Elephants for circuses and zoos are in such demand that the price of a fine specimen is steadily rising.

If de-inking of newspapers so that the paper can be used again comes into wide use, the pulp wood saving would amount to same 275,000 acres of spruce wood.

STUDY HELPS FOR SCIENCE CLASSES

These articles will be found to be especially useful in class work

GENERAL SCIENCE

Earth Speaks to Man, p. 97. Observing the Stars to See if America Drifts, p. 99. Yaquis Fighting for Life, p. 101. Sun's Heat Varies, p. 103. Two Meteor Showers This Month, p. 105. Two New Comets, p. 111. Articles marked with * in classification below.

HYGIENE

City Water Must Be Pure, p. 107. Statues Show Foot Troubles, p. 107. Smallpox This Year, p. 111.

CHEMISTRY

First Enzyme Isolated,* p. 97.

BIOLOGY

First Enzyme Isolated,* p. 97. Studies Giant Cells, p. 101. Man Has Long Old Age,* p. 103. Embryo Determines Growth, p. 103.

PHYSICS

Light's Speed Determined,* p. 103.

(This will fit on a 3 x 5 card.)

Science News-Letter, November 13, 1926

PHYSICS—GEOGRAPHY

Antipodes Absurd

Lactantius (Fourth Century, A.D.), ON THE HERETICAL DOCTRINE OF THE GLOBULAR FORM OF THE EARTH. Quoted by Draper, HISTORY OF INTELLECTUAL DEVELOPMENT.

Is it possible that men can be so absurd as to believe that there are crops and the trees on the other side of the earth that hang downward, and that men have their feet higher than their heads? If you ask them how they defend these monstrosities? how things do not fall away from the earth on that side? they reply that the nature of things is such, that heavy bodies tend toward the centre like the spokes of a wheel, while light bodies, as clouds, smoke, fire, tend from the centre to the heavens on all sides. Now I am really at a loss what to say of those who, when they have once gone wrong, steadily persevere in their folly, and defend one absurd opinion by another.

Science News-Letter, November 13, 1926

ETHNOLOGY

Nature and Indian Nature

Quotation from THE RELATION OF NATURE TO MAN IN ABORIGINAL AMERICA. By Clark Wissler. New York: Oxford University Press. \$3.50.

A hunting tribe will specialize upon one or two kinds of game and so develop a complex of traits, habits and customs favorable to the pursuit of such game. It is also clear that the traits so developed will not extend beyond the range of the game pursued.

A tongue of true prairie land reaches across Illinois and expands over northern Indiana, a geographical factor often overlooked; but ethnic phenomena did not overlook it, because we find in this pocket a tribe of Indians having striking prairie characteristics, though, for the most part, surrounded by forest tribes.

Science News-Letter, November 13, 1926

SCIENCE NEWS-LETTER, The Weekly Summary of Current Science. Published by Science Service, Inc., the Institution for the Popularization of Science organized under the auspices of the National Academy of Sciences, the National Research Council and the American Association for the Advancement of Science.

Publication Office, 1918 Harford Ave., Baltimore, Md. Editorial and Executive Office, 21st and B Sts., N. W., Washington, D. C. Address all communications to Washington, D. C.

Entered as second class matter October 1, 1926, at the postoffice at Baltimore, Md., under the Act of March 3, 1879. Additional entry at Washington, D. C.

Subscription rate—\$5.00 a year postpaid, 10 cents a copy. Ten or more copies to same address, 6 cents a copy. Special reduced subscription rates are available to members of the American Association for the Advancement of Science.

Advertising rates furnished on application.

Copyright, 1926, by Science Service, Inc. Reproduction of any portion of the SCIENCE NEWS-LETTER is strictly prohibited since it is distributed for personal, school, club or library use only. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service, details and samples of which will be gladly sent on request.

Staff of Science Service—Director, Edwin E. Slosson; Managing Editor, Watson Davis; Staff Writers, Frank Thone, James Stokley, Emily C. Davis, Marjorie MacDill Wyckoff; Sales and Advertising Manager, Hallie Jenkins.

Board of Trustees of Science Service—Representing the American Association for the Advancement of Science, J. McKeen Cattell, Vice-President and Chairman of the Executive Committee, Editor, Science, Garrison, N. Y.; D. T. MacDougal, Director, Desert Laboratory, Tucson, Ariz.; M. I. Pupin, Professor of Electromechanics, Columbia University, New York City. Representing the National Academy of Sciences, John C. Merriam, President, Carnegie Institution of Washington; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; A. A. Noyes, Director, Gates Chemical Laboratory, California Institute of Technology, Pasadena, Calif. Representing National Research Council, Vernon Kellogg, Treasurer, Permanent Secretary, National Research Council, Washington, D. C.; C. G. Abbot, Director, Astro-Physical Observatory, Smithsonian Institution, Washington, D. C.; Victor C. Vaughan, Professor Emeritus of Hygiene, University of Michigan. Representing Journalistic Profession, John H. Finley, Associate Editor, New York Times; Frank R. Kent, Baltimore Sun; Mark Sullivan, Writer, Washington, D. C. Representing E. W. Scripps Estate, W. E. Ritter, President, University of California; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Thomas L. Sidlo, Cleveland, Ohio.

Observing the Stars to See if America Drifts



Capt. F. B. Littell, of the U. S. Naval Observatory at Washington, observing through the Prin transit at San Diego to test whether there is any change in longitude occurring. Col. Charles Mailles, of France, stands in the background recording the observations.

By ANDREW R. BOONE

Is the American continent drifting away from Europe and Africa? According to a hypothesis put forward a few years ago by the German geologist, Prof. Alfred Wegener, this is actually happening, and billions of years ago the western coast of Africa fitted into what is now the shore of the Gulf of Mexico and the east coast of South America. Look at a map of the world and you can see how similar the shape of these shore lines are.

Though so far it is only a hypothesis, which may or may not be true, scientists scattered at some 70 radio stations in all parts of the world and at three main observatories at San Diego, California; Shanghai, China; and Algiers, Africa, are now busy observing the sun and stars and exchanging radio time signals in an effort to check the present longitude lines. For if the longitude of a place in America is found to be on the increase, compared with other parts of the world, it would indicate that

the continental drift is actually taking place.

In past years the subject of continental drift has been considered one for geologists, but the development of radio, giving practically instantaneous communication between stations located a third of the world's circumference apart, has made it feasible for astronomers and mathematicians to make an effort to check the longitude lines, and the present worldwide experiment has resulted.

French and American astronomers occupy the three chief stations. The San Diego station, together with those at Algiers and Shanghai, was selected by Gen. Gustave Ferrie, chief of the French communications service and chairman of the International Astronomical Union's commission on determination of longitude by radio telegraphy. Its location was decided upon because of the usually clear weather at that point, and its position about midway between Shanghai and Algiers.

Captain Frank B. Littell, professor of mathematics at the U. S. Naval

Observatory at Washington, D. C.; J. C. Hammond, astronomer and Paul Sollenberger, associate astronomer; and Col. Charles Mailles, representing the French Government, receive their wireless signals and make their calculations in a little shack, windbeaten for several years.

At Shanghai only a small station is located, but its wireless is strong enough to carry to San Diego, while San Diego in turn hears Algiers, a French observatory.

Colonel Mailles is the only foreign observer in the United States for the tests and, while he works independently of the Americans, their results are mutually available. Representatives of the U. S. Coast Guard have been sent to Manila and Honolulu to check the exact longitude differences between those places and United States points.

With their delicate and precise instruments, the scientists follow a simple procedure in their effort to determine whether the world is becoming "lop-sided;" whether North and South America gradually are nearing Asiatic shores. Algiers and San Diego receive signals three times a day from Annapolis at 10:10 p.m., 5:10 a.m. and 3:10 p.m., Eastern Standard Time. Simultaneously, the observers determine the local astronomical time at Algiers and San Diego, then determine the exact difference in time, which thus enables them to determine the longitude difference. For, since one hour's difference in time represents one twenty-fourth of the world's circumference, a time difference may be expressed easily in a longitude difference.

Use of the signals transmitted from Annapolis to the other stations and between stations is made possible through radio perfection and a chronograph (on which time is recorded graphically). On the same instrument astronomical observations are recorded.

The solar observations are brought to the chronograph at the American station by means of two instruments. One is called a Prin transit and is used by Capt. Littell and Mr. Hammond, alternately, while Mr. Sollenberger records the radio signals. This instrument was built in Paris ten years ago and, together with one other, sold to the United States government. It is as accurate as skilled workmen have been able to construct

(Just turn the page)

Observing the Stars

(Continued from Page 99)

such apparatus and on it human error has been reduced to a minimum.

Colonel Mailles, who has represented the French government on scientific ventures in the past, operates a prismatic transit less accurate than the Prin instrument yet valuable both to Colonel Mailles and the Americans in recording the Frenchman's observations and verifying the calculation made by Capt. Littell and Mr. Hammond.

The French scientist sits alone early in the evening of clear nights and early in the morning, in a small boxed square, from which his only view is skyward. The door closed to worldly interference, his vision encompasses only the starry spaces above, where he endeavors to record from eight to 20 standard stars every night, while his American companions try for the same approximate number, though not necessarily the same stars.

Signals reach the observers, whose procedure is typical of that followed at Shanghai, Algiers and the other stations in the net, from Annapolis and Honolulu three times a day in competition with commercial messages flowing along the same short and long wave lengths upon which the set operates: from Saigon, China, once a day, and from Bordeaux, France, when conditions permit.

"The present world cooperation has resulted," said Capt. Littell, "from endeavors started by General Ferrie, who long has been interested in the checking of longitude lines by radio telegraphy. The lack of radio facilities and financial difficulties have made the progress slow, however, and only now have the scientists been able to cooperate and coordinate their activities. Whereas we had intended to have six sets of observers at the three present stations—three French and three Americans—and have each pair move on to a second station after two months, there to remain two months until the entire world circuit had been traveled, we have only three scientific groups. The larger plan would have minimized the chance of error and we could have compared results of radio and solar observations.

"However, with such excellent equipment as the observatories have, we proceed with some assurance of satisfactory results. At each station has been installed high-powered radio apparatus on which to receive the signals. They are connected with the chronographs by wire, so the chronograph receives the same electrical sig-

nal as is transmitted through the wireless apparatus.

"On North Island we Americans come to the plant before sundown to prepare for the night's observations, which commence with the setting of the sun and continue as long as fog and dew permit. Usually we get in four or five hours' good observation before quitting, and start up again in early morning. At sun up, of course, our observations cease.

"When observations are made impossible by local conditions, we rely upon a very accurate clock, which varies less than three one-hundredths of a second in three days. This we consider sufficiently accurate to be considered local astronomical time. The clock has been installed below ground on a concrete base detached from the building and anything else which might impart man-made shocks to it. It is enclosed in an airtight glass case, in a concrete room kept at an even temperature of 87 degrees Fahrenheit, assured of constancy by electric heaters controlled by a sensitive thermostat.

"Under weather conditions usually equable, Colonel Mailles and our group have proceeded with plans which we hope will, in a period of years, indicate whether the Americas are drifting westward as Professor Wegener thought. Of course we will learn nothing immediately, but if a second series of observations can be arranged a few years from now—say a decade—astronomers and mathematicians can, by comparing the two sets of observations, determine to what extent the land bodies have shifted. It will be very, very, little in ten years, of course, providing there is any, for the movement of North and South America from any point farther east has taken billions of years. If, at one time, their Atlantic shore lines approached or coincided with those of Europe and Africa, their movement in a decade could be measured only by very fine and accurate observations."

The results of the present observations will be compiled individually by the various astronomical groups, except those under supervision of the French society. No plan has been perfected whereby all the reports and related data will be taken to one "clearing house" for centralized study, though this is expected to be brought about in some manner.

The whole scheme is a world movement, a giant cooperative enterprise, without an official head. Like Topsy,

it "just grew." Unofficially, General Ferrie may be termed the head of the experiment, for he fostered the plans which finally resulted in the present work.

Whether the North American continent is drifting away from the South American continent is not considered by the scientists to be a "scientific problem" worthy of special study. They are confining their investigation largely to the potential drift westward of the Americas, though any evidence of the northerly drift of North America will cause a re-vamping of their investigation plans and further investigation later.

If one or more continents is found to be shifting, the finding will bear out the principle of isostasy, or "compensation" of the earth's crust; that is, that the upper crust rests on a more or less plastic substance which permits a too-heavy spot to sink and a lighter one elsewhere to rise up. Thus, the continents would be said to rest on and "slide" on this plastic substance, whatever it may be.

Ordinarily scientific men are interested in principles. The case of possible continental drift presents a problem wherein the astronomers are more concerned in the fact. How a continent would drift would follow a principle already accepted by the scientific world, but the fact of drift has not yet been generally accepted. Professor Wegener and one or two American geologists have believed the Americas are drifting, but the majority await the results of the solar and radio observations and tests.

While the actual facts of the extent of the observations remain somewhat obscure—the American observers do not know definitely how many countries or radio stations are included in the network—the final compilation of data is, in a general way, assured. Captain Littell expects to return to Washington at the close of his two-months' session at San Diego, sometime late in November, and there commence the task of studying and interpreting his figures. Colonel Mailles plans to go on to Japan for similar studies, later to return to Paris where he will compile his statistics of the stars.

Thus, in a way both haphazard and orderly, men of the scientific world will continue to go forward with their measurement of longitude lines which eventually will tell the lay world whether their feet are planted on spots stationary or in motion.

Science News-Letter, November 13, 1926

Yaquis Fighting For Life

By ALBERT B. REAGAN

Mr. Reagan is an ethnologist, recognized as an authority on North American Indians, among whom he has lived for many years. The Mexican government has undertaken a war of extermination against the Yaqui Indians, a wild tribe never yet subdued by white men. The aerial bombardment of two of their villages, noted recently in the press, is a prelude to the real fighting.

In the warfare between the Mexican government and the Yaqui Indians in the State of Sonora, the world is perhaps witnessing the passing of a nation, for the war levied by Mexico will in all probability be one of extinction.

The Yaquis or Hiaquis are said by some ethnologists to have received their name from their principal river, the Rio Yaqui, while others state that they were so named because their talking is in a loud and rough tone, "Yaqui" meaning literally "he who shouts," the river receiving its name from them. When first known to history they occupied a large territory on both sides of our present Mexican boundary, some authorities stating that their possessions extended even as far east as Texas and as far south as Durango in Mexico. They then numbered about 400,000. They now number about 15,000, five thousand of whom are capable of bearing arms.

Although at war with the whites since 1740, the Yaquis are an unconquered people. Even their so-called defeat in 1832 cannot be construed as actual when it is remembered that they have since warred against Mexico and been treated with as a nation, that they hold the lands of their present residence under grant from Spain, and that they are governed by their own laws, never having yielded to Mexico.

Their villages are literally cities of refuge under their laws and the fugitive is in sanctuary when he passes the gates of Coorit, Bacum, Torin, or any of the pueblos in the fastnesses of the Vacatete mountains.

General Torres, who commanded the expeditions against the Yaquis in 1896-1897 and in 1899-1901, seemed to be successful in every encounter, with the losses light on the Mexican side and heavy with the Yaquis. However, the peace which concluded the hostilities was not lasting. In 1882 they defeated the Mexicans under General Garcia, killing that officer and four hundred of his soldiers; and they are better armed now than then.

In this war as in the previous ones the Mexicans must follow to the inaccessible natural fortifications of the

(Just turn the page)



ALES HRDLICKA

Tracer of Ancient Trails

Virgil in his great poem has his hero visit the shades of his ancestors in the nether world. A more modern and much more extensive Æneid, embracing the whole round earth and seeking the forebears not of one family but of the entire human race, has occupied the active scientific career of Dr. Ales Hrdlicka, curator of anthropology at the U. S. National Museum, who believes in seeing with his own eyes and examining with his own hands. The most significant of his more recent pilgrimages was his voyage around the world, during which he visited the sites of all the important discoveries of prehistoric man; Crô-Magnon, Neanderthal, Mauer, Piltdown, Broken Hill, Trinil, winding up with a visit to India and to the land of "contemporary ancestors," Australia. His most recent journey was to Alaska and the Bering Sea islands, for the purpose of studying the traces left by man as he migrated from Asia to America.

Dr. Hrdlicka was born in Bohemia in 1869. He was trained in medicine in New York and Paris, but early shifted his interest to anthropology. He was connected at first with the American Museum of Natural History in New York, beginning his career as anthropologist in the State Service of New York. In 1903 he was called to the U. S. National Museum to organize a division of physical anthropology, and has been curator of this division since 1910. Since 1920 he has been a member of the National Academy of Sciences.

Science News-Letter, November 13, 1926

Studies Giant Cells

How does the living stuff in plant and animal cells make its choice between what it lets in and what it keeps out?

This is the question attacked by Dr. W. J. V. Osterhout of the Rockefeller Institute, New York City, who spoke before the meeting of the National Academy of Sciences, telling how he has been aided in his researches by the use of a tropical seaweed named *Valonia*. Each specimen of this plant is made up of a single cell from one to six inches long—a gigantic size for cells, which are usually so small that a microscope must be employed to see them individually. Because these cells are so large, Dr. Osterhout has been able to inject various solutions into them and then measure how fast the various chemicals can pass through the layer of living substance or protoplasm. Electrical charges seem to have a great deal to do with the secret, he says, for in solutions where the chemicals have broken down into ions carrying electrical charges they are not permitted to pass by the protoplasm, whereas chemicals that have remained as whole molecules, with neutralized electrical charges, in certain cases penetrate the living layer without difficulty.

Science News-Letter, November 13, 1926

PSYCHOLOGY

Children Individualists

Young children are more truly individuals than older persons, largely because the schools tend to level out idiosyncrasies rather than to develop differences. This is the finding of Dr. Truman L. Kelley, professor of education and psychology at Stanford University, as a result of a statistical study of the influence of training upon native mental differences in school children.

Over 200 children that are gifted mentally were compared with 1,700 normal children by Dr. Kelley. The gifted eight-year-old children were more individual mentally than normal eight-year-olds. But he found that between eight and eleven years the gifted children have their individual traits ironed out by the public school influence, so that at 11 years they have fewer mental idiosyncrasies than normal 11-year-olds. These gifted 11-year-olds are more like normal children of 14 years in respect to their peculiarities, just as they are like the 14-year-olds in other mental traits, he reports.

Science News-Letter, November 13, 1926

Have You A Few Friends

who do not know the
SCIENCE NEWS-LETTER?

As a subscriber to the most unusual scientific magazine of the hour you are, we hope, enthusiastic. We know you appreciate obtaining scientific news months before it can possibly be printed in book form.

The tastes of your friends harmonize with your own—send us the names of several men and women who will be interested in obtaining scientific NEWS.

We shall be glad to send, free to your intimates, a copy of the weekly SCIENCE NEWS-LETTER.

(Kindly state whether you wish your name mentioned in the sending of sample copies.)

M _____

M _____

M _____

SCIENCE SERVICE
21st and B Sts.
Washington, D. C.

Tune In On Our Science Radio Talks!

In cooperation with leading broadcasting stations, Science Service presents a weekly radio talk on

"SCIENCE NEWS OF THE WEEK"

These are given from
the following stations:

- KUOK University of Arkansas, Fayetteville, Ark.
- WEAO Ohio State University, Columbus, Ohio.
- WCAD St. Lawrence Univ., Canton, N. Y.
- WDAE Tampa Daily Times, Tampa, Fla.
- WDBO Rollins College, Winter Park, Fla.
- WEBW Beloit College, Beloit, Wisc.
- WEEI Edison Elect. & Illuminating Co., Boston, Mass. (In cooperation with the Boston Transcript.)
- WGBX University of Maine, Orono, Me.
- WHAS The Courier-Journal, Louisville, Ky.
- WHAZ Rennselaer Poly. Inst., Troy, N. Y.
- WMAL The Washington Radio Forum, Washington, D. C.
- WMAQ Chicago Daily News, Chicago, Ill.
- WOO John Wanamaker, Philadelphia, Pa.
- WRAV Antioch College, Yellow Springs, Ohio.
- WRC Radio Corp. of America, Washington, D. C. (Talks by eminent scientists.)

Watch the program of the station nearest you to see what time these talks are given. If no station near you gives them, write us, suggesting any station that you think might give them.

SCIENCE SERVICE
21st & B Sts.
Washington, D. C.

Yaquis Fighting For Life

(Continued from Page 101)

Vacatete mountains. A family of fourteen held a pass in these mountains in 1894 against 400 Mexican soldiers for three days. On the fourth the attacking party were able to get skirmishers upon a narrow ledge above, whereupon the defenders retreated. That evening the Mexicans were halted by shots from an adobe chapel near the edge of a narrow mesa at the mouth of a gorge.

They were held at bay there four days longer and it was only after they had battered the building down with howitzer fire that they were able to pass. It was then they discovered that they had been again held by the same family who had held the first pass. All were dead but a boy, who was wounded so seriously that he died within the hour.

Since 1848 Mexico has lost 40,000 soldiers and spent millions of money in its wars against this people. Moreover, in the present outbreak they may be making their last fight, and the world may expect an heroic one.

Science News-Letter, November 13, 1926

Paper can be made from corn by a new process.

Judging by their teeth, the average age attained by Indian elephants is 70 years.

Water flowing from deep artesian wells is warm because of the internal heat of the earth.

Coronium, a gas found in the corona of the sun, has not yet been found in any star nor on the earth.

Aquatic plants purify water by taking up carbonic acid gas and giving off oxygen, and often save fish from asphyxiation.

The antelope, which is so generally becoming rare, has increased in Wyoming to the extent that farmers have begun to complain.

A woman is estimated to have about 67 per cent as much ability and endurance in running as a man of similar weight.

Apparatus recently invented makes it possible to measure the thickness of the outer layer of pearl of a cultured pearl.

Elephants used as beasts of burden in India and Siam must almost always be caught wild, as the captives rarely breed.

Highlights of National Academy of Sciences Sessions

The National Academy of Sciences held its fall meeting at Philadelphia, Nov. 8 to 10. The following articles report some of the papers presented at its scientific sessions.

PHYSICS

Light's Speed Determined

The speed of light is 299,796 kilometers per second (186,284 miles per second). This is the final determination for the velocity of light as announced to the National Academy of Sciences by Prof. A. A. Michelson, of the University of Chicago, and president of the academy.

This figure is the culmination of years of effort on the part of Prof. Michelson. He made his first experiments when a young officer on duty at the U. S. Naval Academy at Annapolis. Within the past three years he has been working at the Mount Wilson Observatory refining the figure for the velocity of light. The most accurately measured base line in the world, about twenty-two miles long stretching between Mt. Wilson and Mt. San Antonio, was used. Prof. Michelson projected a powerful light through a narrow slit onto a mirror which was spinning at the rate of about 30,000 revolutions per minute, which in turn projected it on a reflecting apparatus at the far station. The reflector returned the light to the original source. With an accurate knowledge of the rate at which the mirror is revolving and the distance between the two stations, the velocity of light can be calculated.

Science News-Letter, November 13, 1926

PHYSIOLOGY

Embryo Determines Growth

The development and behavior of an animal is clearly foreshadowed before its birth in the way its nervous system grows. That the nervous system is the most precocious of all the parts of the body, is indicated by the studies of Prof. G. E. Coghill of the University of Kansas, who spoke before the National Academy of Sciences.

Experiments on the embryos of some of the lower vertebrates have shown, he said, that certain foci or points of intense growth of the formative nervous system later on become the controlling points in the behavior of relatively advanced or even adult life. Furthermore, where various parts of the body later act together, this cooperation is foreshadowed by the previous growth of coordinating nervous mechanisms.

Science News-Letter, November 13, 1926

GENETICS

Man Has Long Old Age

Compared with some other mammals, man has a relatively brief prenatal life, a long childhood, a short reproductive period and a long old age.

Thus declared Dr. C. B. Davenport of the Genetics Laboratory of the Carnegie Institution of Washington in summing up before members of the National Academy of Sciences his conclusions from studies made of growth in laboratory animals and man.

"The maximum length of the ordinary human life span," said Dr. Davenport, "may be taken as 295 hundred days, that of the guinea pig at 15 hundred and that of mice as 10 hundred days. Reducing these life spans each 100 per cent, we may determine the percentage of the whole constituted by each of four periods; intrauterine, prepubertal, reproductive and senescent. The most striking contrast in this comparison is the prepubertal life of the child, relatively two or three times as long as in the other mammals plotted. The second outstanding fact is that the reproductive period in man is relatively short, only about two thirds that of the mouse. On the other hand, man's post-reproductive period is correspondingly prolonged."

"Evidently this state of affairs," continued Dr. Davenport, "permits of prolonged training for the period of maturity when a man's best work is done. It tends to lead man to minimize the real importance of reproduction to the species. It tends to emphasize training and achievement and the accumulation and transmission to the next generation of the results of experience which are possible where life is prolonged beyond the reproductive period. The tendency of modern, intensive training and the stress on economic status is to extend the pre-reproductive period throughout the first third of life, so that practically only about 25 per cent of the maximum life span is available for reproduction."

Man's high development along intellectual and social lines has been favored by his slow growth and comparatively short reproductive period. The social and economic pressure on the more advanced of the intellectual types of people, however, he warned, cuts into their reproductive period to such an extent that they are threatened with extinction.

Science News-Letter, November 13, 1926

ASTRONOMY

Sun's Heat Varies

The sun is a variable star. This can be proven even though the variation of transparency of the earth's atmosphere at different times of year produces apparent changes in the brightness of the sun, Dr. Charles G. Abbot, director of the Smithsonian Institution's Astrophysical Observatory, told members of the National Academy of Sciences.

The trouble with measurements of the sun's radiation in the ordinary way is in this diminution of the light by varying degrees by different conditions of the atmosphere, Dr. Abbot told the scientists, and some critics have expressed the belief that previous efforts to show the sun variable were in error because the observer was unable to properly allow for the atmospheric changes.

Now, by selecting data obtained in the same months in successive years and when all the other conditions, as the height of the sun above the horizon, and the humidity, were similar, Dr. Abbot has been able to compare the light of the sun at various times as if there were no atmosphere. As a result, he finds a marked variation, in close agreement with the variations previously found. Both this and the earlier series of observations have indicated that the radiation from the sun is greater when the sun spots are most numerous.

Science News-Letter, November 13, 1926

ARCHAEOLOGY

Newest Pueblo Discovery

Discovery of a crudely built prehistoric pueblo, was formally announced by Dr. J. Walter Fewkes, of the American Bureau of Ethnology, to the National Academy of Sciences.

The newest pueblo find, known as Elden Pueblo, lies only six miles from Flagstaff, Arizona, and the National Trail Highway passes within 200 yards of it. Residents of Flagstaff long ago recognized that the clearing in the pines was a site of some ancient settlement, Dr. Fewkes said. But the ruins were practically unknown to scientists until this summer.

The prehistoric inhabitants of Elden Pueblo were related to the modern Hopi Indians, it is believed.

"Both the architecture and ceramics point to a respectable antiquity of 500 to 800 years, as the decorations are archaic and the masonry crude," he said.

Science News-Letter, November 13, 1926

News-Letter Features

Born over four years ago, on March 13, 1922, of the demand and interest of those individuals who had caught a glimpse of *Science Service's* news reports to newspapers, the SCIENCE NEWS-LETTER has since proved interesting to laymen, scientists, students, teachers and children.

Into the pages of the NEWS-LETTER are fed the cream of *Science Service's* output directed at the newspapers of the world. To this is added material especially prepared.

Turn the pages and note:

It is a *separable* magazine. You can clip or tear out any article without losing or damaging another article on the other side.

Each article is automatically *indexed* by the key word printed above its heading. (See page 108 for explanation.)

Each article is automatically *dated* by its last line.

Books are *reviewed in brief* as they are received from the publishers.

The classics of science and striking passages from current books, addresses and periodicals are carefully selected and published.

Important *anniversaries* of science are appropriately noted week by week in a special department.

Regular articles tell of the happenings in the *skies* and in the *great outdoors*.

Photographs aid in the telling of the week's science.

Science News-Letter, November 13, 1926

Past Volumes

Nine volumes of the SCIENCE NEWS-LETTER have been issued in mimeographed form. Volume I consisted of numbers 50 to 90, inclusive, including the period March 13 to December 30, 1922; thereafter volumes consisted of 26 numbers covering half-year periods, with the exception of Volume IX which consisted of numbers 273 to 285, inclusive, and included the three-month period of July, August and September of this year. Volume X began with No. 286, the first to be printed, and will cover only the three last months of this year. Thereafter volumes will cover half-year periods. The pages in each volume will be numbered consecutively.

Science News-Letter, November 13, 1926

Peru has the largest Asiatic population of any South American country.

Fish frozen in blocks of ice can be transported long distances to market.

Sour juices are more suitable for jelly making than juices lacking in acid.

A dust attack from airplanes has been used in combatting grasshoppers in Russia.

Watchmakers say that 90 per cent of the jewels used in watches today are synthetic.

A new Federal bird reservation has been created on two small islands in the Columbia River.

A new source of very pure salt brine has been found in Michigan at a depth of 1,200 feet.

Manufacturers of fireworks have stopped using phosphorus, which is so poisonous to workers.

A compound of carbon and tungsten is so hard that it is replacing diamonds in dies and drills.

Special Introductory Subscription Offer

For those not yet acquainted with THE SCIENCE NEWS-LETTER, this special short-term subscription rate is available. This is a case when 13 is your lucky number. Just clip a dollar bill to this blank, fill in your name and address and mail at our risk.

Science Service

21st and B Sts.

Washington, D. C.

Make me acquainted with the Science News-Letter for 13 weeks. Here is my dollar.

Name

Address

Two Meteor Showers Will Light Heavens This Month

By JAMES STOKLEY

This month, as last, the planet Mars is the chief object of interest in the evening sky, and astronomers in many observatories are carefully watching, drawing and photographing it, for this fall it is closer than it has been since 1924, and closer than it will be for many years to come. On the 27th of October only 43,728,000 miles separated the earth from this neighboring planet, which was its nearest approach on this visit. Now it has started to recede, and on the 15th of November will be 45,530,000 miles away, but will still be high in the heavens and well placed to observe. On the 4th it was in opposition, or on the side of the earth directly opposite the sun, when it rose in the east at sunset and set in the west at sunrise, making it a conspicuous object throughout the night. Its brilliancy and reddish hue as it shines in the eastern evening sky makes it easy to identify.

At the Lowell Observatory in Arizona, which is located on a plateau 7,000 feet above sea level, the most extensive observations of Mars are being made, chiefly by Mr. E. C. Slipher. These have been in progress since April 1, when the southern hemisphere of Mars was having its vernal equinox, and spring there was commencing. Since the planet takes longer to revolve around the sun than the earth does, the seasons there are longer than they are here, and so their summer in the south has just begun.

The most noticeable change that has occurred on the planet since observations began this year is the shrinkage of the south polar cap, consisting of ice and snow around Mars' south pole. According to Mr. Slipher, this polar cap was at least 3,500 miles across on April 1, but now it has shrunk to a fraction of the diameter.

"The 'seas' and other dark markings of the southern hemisphere are now quite dark," says Mr. Slipher, "and, on the whole, present an appearance remarkably similar to that at the opposition in 1909. One observing Mars now would be struck by certain changes in some of the dark markings since 1924." One of these changes he says, has affected the Syrtis Major, a wedge-shaped dark patch which is one of the most prominent of all Martian markings.

Low in the western evening sky, Jupiter can still be seen, and it also

has been the subject of the Lowell Observatory scrutiny which shows that in recent months it has been undergoing remarkable changes in appearance. These have taken place principally in the planet's southern hemisphere, almost all of which has been affected, chiefly the broad belts which normally surround the planet, parallel to the equator, something like the zones on a terrestrial globe.

The south tropical belt, which was broad and prominent in 1925 and earlier, has almost disappeared during the last two months and now that part of the planet is covered by a broad, bright belt which is slightly brighter than the equatorial bright belt.

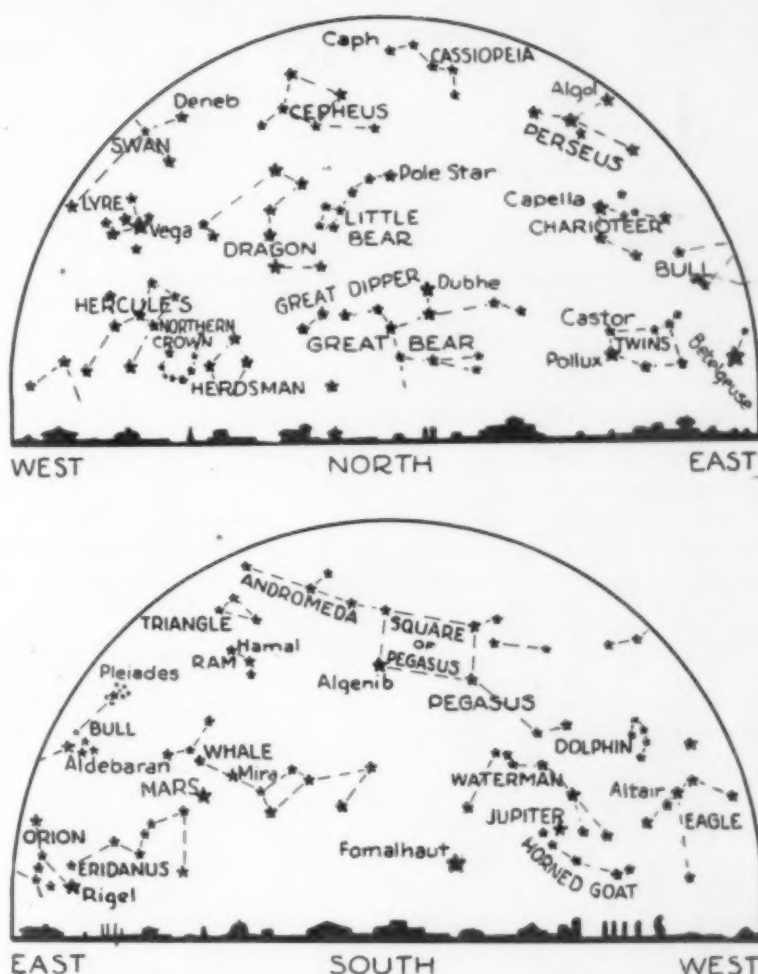
Another change has affected the "Great Red Spot." This first appeared in 1878 when it was about 25,000 miles long and 8,700 miles wide. At first it had a distinct reddish color, but this later faded out. According to Mr. Slipher, it now ap-

pears to show considerable color again, being decidedly pink, instead of the neutral gray that it has been in recent years.

In 1919 a change swept over the same region of Jupiter producing essentially the same changes that have occurred in the present disturbance, and later the dark belts reappeared in much the same form and position that they formerly possessed.

November is also one of the best times for meteors, for two of the principal meteor showers occur this month. They are the Leonids and the Andromedes, so called because they seem to radiate from the constellations of Leo and Andromeda. The latter is shown on the map for this month; Leo, however, is not visible until early morning, and about 4.00 a.m. it can be seen in the southeast. In it is the familiar "Sickle," a star group having the shape of a reversed ques-

(Turn to Page 107)



These two maps show the principal constellations that are visible in November. Face north or south, hold the map in front of you, and it will show the stars as they appear in the sky.

The Purpose of Science Service

is to disseminate science throughout the world of educated men and women. Through the medium of eleven services syndicated to newspapers we reach millions of readers. The **SCIENCE NEWS-LETTER** is only a by-product of our organization. It is the only service available for individual subscription.

Listed below are our newspaper services. They are obtainable by the newspaper of your own city. Their cost is low, making them fit in with the budget of any daily or weekly paper. Check the services you feel will benefit your community the most, then send us the name of your editor and his paper. We will gladly send him samples of our services.

Daily Science News Bulletin is a daily service to newspapers, large and small. Three to five up-to-the-minute vivid stories are at the editor's disposal in each mailing.

Illustrated Feature Articles, issued each week, are our most pretentious product. They are written on timely subjects and are complete with photo-prints, suitable for use in Sunday or special editions.

Telegraphic Specials give to the editor news of the large scientific meetings of importance. Each day during meetings such news is wired to newspapers by one of our staff on the scene.

Why the Weather is issued each day—and in it Dr. Charles F. Brooks, meteorologist, tells the "why" of climatic conditions that puzzle. Weather conditions near and far are brilliantly, cleverly explained.

Nature's Notebook is a daily feature of special appeal to boys and girls who love the small folk of wood and field and sky. Grown-ups, also, are interested in this illustrated service.

Isn't It Odd is a weekly feature dealing with the oddities of the folk, little and big, in the world of Nature.

Current Radio is a daily feature that gives to the radio enthusiast instructive knowledge of this new wonder and teaches him not only to RE-CEIVE but to SEND. Clear line-drawings accompany each article.

Science Shorts comprises from forty-five to fifty authentic sentences of scientific trend and prove excellent whether used as fillers or as a daily feature in groups of six or eight.

Photographic Service, picturing men and women in the world of science and their accomplishments, gives to editors distinctive and graphic science news. Short biographies and explanations accompany each picture.

The Star Story Map is a monthly article concerning the inhabitants of the sky. It is illustrated, thus each star is definitely placed for the readers of this feature.

Ventures Into Science are daily articles written especially for the editorial page. Each venture is complete and interprets as well as tells in clever fashion the latest in science.

We shall be glad to cooperate with you in the placing of any of our services in the newspaper you read.

SCIENCE SERVICE

21st and B Streets

Washington, D. C.

Statues Show Foot Troubles

Famous statues of ancient times are usually cited to show that foot troubles are a comparatively modern plague, which came into existence along with confining leather shoes. But realistic statues of the ancient world also show that the ancients developed shoe troubles and that their feet were affected.

A report in a recent number of the *Antiquarian*, an archaeological journal, states that very early statues do show perfect feet. Egyptian sculptors carved feet with a straight inner edge, and with toes of natural shape. The same perfection of shape is true in early Assyrian sculptures. In the Greek statues of the archaic period, usually dated as from 580 to 520 B. C., the symmetrical shape of the toes is always noticeable. The bronze Discus thrower, or Discobolus, of Myron of the early 5th century B. C. shows fine, well modelled, toes.

But beginning in the late 5th, and during the 4th century B. C., a deformity of the little toe begins to appear, the archaeologist finds. Even the famous Hermes of Praxiteles, found at Olympia, shows the fifth or little toe pressed or crushed into the fourth toe. The typical foot for the next several centuries is a straight great toe, a rather wide gap between it and the second toe, and a deformed little, or fifth, toe.

The malformations mentioned, namely the gap between the great and second toes, and the deformed fifth toe are clearly due to the type of sandals, he says. The type generally worn had a single inter-toe thong that came up between the great and second toes, and a cross strap which prevented a natural expansion of the little toe. The statuary of the last three centuries B. C., and of the first two centuries A. D., are correctly realistic in their modelling, despite the fact that realism, if it extends to the reproduction of malformation, was and is considered unartistic.

Science News-Letter, November 13, 1926

HYGIENE

City Water Must Be Pure

Polluted city water has enabled a typhoid patient to collect damages from the city of Albany for permanent injury to his health. A \$3,000 verdict was awarded on the ground that the city contracts with each citizen to furnish unpolluted water and had failed to warn the people that such pollution existed.

Thirteen of the 200 cases that occurred in the same typhoid outbreak

filed notice of suit within the required period and may also bring suit. If the decision is upheld by the higher court where the city intends to carry it the case will establish an important precedent.

Science News-Letter, November 13, 1926

Two Meteor Showers

(Continued from Page 105)

tion mark, with the brilliant Regulus at the bottom.

Actually, these meteors are moving in practically parallel paths through space, and the radiant, or point from which they seem to spread out, is simply an effect of perspective, as the rails of a long straight track seem to meet in the distance. Once a year the earth crosses the path of the meteors and shooting stars, which are simply meteors that are being burned up by the friction of the earth's air, then are particularly numerous. In the case of the Andromedes, the meteors are probably the remains of Biela's Comet, which, after several visits to the earth, mysteriously vanished.

The average height of meteors above the earth's surface is about 61 miles, so that they are by far the closest of all celestial phenomena. Though the earth's atmosphere extends up much higher than that, the meteors do not begin to glow until the earth's atmosphere is dense enough to cause friction. Meteors in general first appear at heights of about 76 miles and by the time they fall to a height of 51 miles they are burned up, but occasionally one lands on the earth. They move with an average speed of about twenty-seven miles a second, so it is a fortunate thing that we are surrounded by atmosphere or else the earth would be continually bombarded.

The accompanying maps show the stars as they appear this month, the great "Square of Pegasus," which is partly in Andromeda, being conspicuous in the south. Below it is Fomalhaut, in the Southern Fish, one of the most southerly stars visible from the United States. Low in the east the Twins, Castor and Pollux, can be seen, and nearby Orion, perhaps the most magnificent of all the constellations and which, in a few months, will be in a position where we can fully appreciate it.

Science News-Letter, November 13, 1926

Owners of vessels whose ships must traverse shallow water watch water level reports and take advantage of high water to load their ships to greater drafts.

NATURE RAMBLINGS

By FRANK THONE



A November Voice

To most people there is nothing more suggestive of desolation and loneliness than the cry of the loon. Sounding through the chill dusk of a November evening, across the gray, cold surface of a lake that is sullenly waiting to be bound in ice, it is the very voice of the border-time between autumn and winter.

But from the bird's own point of view, the loon is a great success. Birds very much like them existed in Miocene geological times, something over a million years ago; and a survival with little modification for so long a time as that is in itself a strong argument of a good design to begin with. Latterly the loon has had to face the activities of the most destructive of all predatory animals, man, and it has survived even this terrific test far better than have most of its web-footed kindred.

One reason for this very considerable success is the superiority of the loon as a submarine mechanism. It can dive so quickly that the legend has arisen of its ability to see the flash of a hunter's gun and submerge before the shot can reach it. It can, at the other extreme, submerge so gradually that it does not betray itself by the slightest splash or ripple, and it can swim under water indefinitely with only the tip of its beak at the surface for air. Sometimes it sticks up its head like the top of a periscope for a look around, and then pops under again, to reappear dozens of yards away in a few seconds. It is one of the flying birds that also uses its wings under water for oars, and can thus attain an almost penguin-like speed swimming submerged.

Science News-Letter, November 13, 1926

The Navy is to have an experimental airship built entirely of metal.

The house in Berlin where Koch discovered the tuberculosis bacillus has been marked by a tablet.

The Argentine government is organizing an expedition to explore the Antarctic and South Polar regions.

(By Science Service)

is the hallmark of accurate, yet interesting, scientific news and features. Whenever you see the name of our organization, or the credit line, or the **SCIENCE SERVICE** insignia in newspaper or magazine, you know that authentic scientific information is being presented.



Science Service presents to the public definite scientific facts, in a popularized style, that appeal not only to men and women of science—but to the laymen interested in the scientific wonders of the day.

SCIENCE SERVICE

21st and B Sts.

Washington, D. C.

Science News-Letter Is Already Indexed

In order to aid in catching the items that concern you and to facilitate clipping and filing, a key word in small capitals has been printed on the right of the line above each article. This follows the classification of the Library of Congress since this system has come into common use in the libraries of the country owing to the publication by the Government of the card index of all new books. We print below a list of the subject titles which will be most used in the **SCIENCE NEWS-LETTER**. "Outline Scheme of Classes," issued by the Library of Congress and purchasable from the Superintendent of Documents, Washington, for 10 cents, contains a more complete classification.

How To Clip and Classify

The **SCIENCE NEWS-LETTER** is a "cut-up" periodical. It aims to provide the information you want when and where you want it. It is a continuous loose-leaf supplement to any text-book or encyclopedia. But to make it most useful you must do your part. The best way to handle current news in science is to adopt the rule of the thrifty housewife in fruit season: "Eat what you can and what you can't eat you can."

Here is a good scheme if you haven't a better one. Get a dozen or twenty folders or envelopes which fit in a vertical filing case or drawer. Cut out the class titles of topics and paste on the upper edge of the envelopes. Or write on such titles as you prefer. If you use the Dewey Index or some other system put these numbers or letters in place of the Library of Congress marks.

As soon as you get a copy of **SCIENCE NEWS-LETTER** look it over, read through such articles as you have time to and cut out such as seem to you worth preserving for reference. Drop the clippings into their proper envelopes right away. Don't throw them into a desk drawer to accumulate until you have time to sort them over. You never will find time for that. At least we hope you will always have something more pleasant and profitable to do than filing a heap of old clippings. **SCIENCE NEWS-LETTER** is a new sort of magazine. Try a new way of using it.

Classification

B Philosophy.
BF Psychology.
G Geography, voyages, travel.
GA Mathematical and astronomical geography.

GB Physical geography.
GC Oceanology and oceanography.
GF Anthropogeography.
GN Anthropology. Somatology. Ethnology. Ethnography. Prehistoric archaeology.
GR Folklore.
GT Manners and customs.
GV Sports and amusements. Games.
HC Economic history and conditions. National production.
HE Transportation and communication.
HF Commerce.
HM Sociology. General.
L Education.
M Music.
N Fine Arts.
P Philology and linguistics.
Q Science. General.
QA Mathematics.
QB Astronomy.
QC Physics.
QD Chemistry.
QE Geology.
QH Natural history.
QK Botany.
QL Zoology.
QM Human anatomy.
QP Physiology.
QR Bacteriology.
R Medicine. General.
S Agriculture. General.
SB Field crops. Horticulture. Landscape gardening. Pests and plant diseases.
SD Forestry.
SF Animal culture. Veterinary medicine.
SH Fish culture and fisheries.
SK Hunting. Game protection.
T Technology. General.
TA Engineering—General.
TC Hydraulic engineering.
TD Sanitary and municipal engineering.
TE Roads and pavements.
TF Railroads.
TG Bridges and roofs.
TH Building construction.
TJ Mechanical engineering.
TK Electrical engineering and industries.
TL Motor vehicles. Cycles. Aeronautics.
TN Mineral industries. Mining and Metallurgy.
TP Chemical technology.
TR Photography.
TS Manufactures.
TT Trade.
TX Domestic science.
U Military science. General.
V Naval science. General.

Science News-Letter, November 13, 1926

Broadcasting's Prototype

Quotation from *EXPLORING LIFE—The Autobiography of Thomas A. Watson*. New York. D. Appleton and Company. Mr. Watson was Bell's assistant in the early work with the telephone.

Bell gave three lectures on his invention at Music Hall, Boston, to large audiences, and after that three lectures at Chickering Hall, New York, and others in most of the large cities of New England. They were all given in the spring and summer of 1877. They interfered with our laboratory work, but the use of the telephone in connection with the lectures was an important help in its development as a practical working instrument.

I played an important part in Bell's lectures although I was always invisible to his audiences, being stationed every evening at the distant end of a telegraph wire connecting with the hall, having in my charge apparatus to generate the various telephonic phenomena Bell needed to illustrate his lectures. I had at my end of the line one of our loudest telephones especially adapted for the purpose, an electric organ on the principle of Bell's harmonic telegraph, a cornet player and sometimes a small brass band. But I was the star illustrator of Bell's lectures. My function was to prove to the audience that the telephone could really talk, for which my two years of shouting into telephones of all sizes and shapes had fitted me admirably as it had developed in me a vocal power approximating that of a steam organ in a circus parade. I also had to do something else of importance for Bell's audiences, called by courtesy, singing.

Professor Bell had by his side on the stage a telephone of the big box variety we used at that time, and three or four others of the same type were suspended about the hall, all connected by means of a hired telegraph wire with the place where I was stationed, from five to twenty-five miles away. During the first part of his lecture Bell gave his audience the commonplace parts of the show, organ playing, cornet music, brass band, etc., and then came the thrillers of the evening—my shouts and songs. I shouted such sentences as, "Good evening," "How do you do?" "What do you think of the telephone?" which the audience could hear, although the words issued from the mouthpiece rather badly blurred by the defective talking powers of the telephones of that date. When I would sing the only songs I knew. They were, "Hold the Fort," "Pull for the Shore"

(I got these from Moody and Sankey who had just come to this country), "Yankee Doodle," "Auld Lang Syne," and a sentimental song I had learned somewhere called, "Do Not Trust Him, Gentle Lady." My singing was always a hit. The telephone obscured its defects and gave it a mystic touch. After each of my songs I would listen at my telephone for further directions from the lecturer and always felt the thrill of the artist when I heard the applause that showed me how much the audience appreciated my efforts. I was usually encored to the limit of my repertory.

Science News-Letter, November 13, 1926

AVIATION

Aerial Travel

Quotation from *TRANSPORT AVIATION*. By Archibald Black. New York. Simmons-Boardman.

Air transport lines are not quite out of the experimental stage, although several years have passed since the first was initiated. So far as commercial *operating* experience is concerned it is true that the airplane and airship are far from being experiments. With the business side, however, the story is quite different. Few airlines in the world are actually paying their way and operations are continued usually through the assistance of heavy subsidies. This would be most discouraging were it not that traffic is growing, deficits are decreasing and indications are pointing steadily to elimination of artificial support in the near future.

It has been demonstrated thoroughly that the success of air transport depends as much upon education of the public to its use as upon its technical perfection. Strictly speaking, there is no "demand" for air transport. This, however, is no cause for discouragement; as C. M. Manly very aptly put it, there was no demand for bathtubs a couple of generations ago. As will be pointed out in later chapters, aircraft possess certain elements which are valuable in transportation. The attainment of success depends upon educating the public to their use. This is a slow process but one which is proceeding as rapidly as can be expected and the results are encouraging if the problem is appreciated.

Science News-Letter, November 13, 1926

Synthetic rubber which lacks elasticity can be used for hard rubber compounds and for cable insulation.

The planet Mercury always keeps the same face to the sun, making one side hot and the other extremely cold.

First Glances at New Books

THE AMERICAN COLLEGE AND ITS RULERS. By J. E. Kirkpatrick. New York. New Republic. \$1.

Caustic criticism of collegiate administration under "Captains of Erudition" by the hero or victim of the "Washburn College Case." Author advocates a commission form of government as the next step toward democratizing college control.

THE JOURNAL OF PREVENTIVE MEDICINE, Vol. I, No. 1. Edited by Edwin O. Jordan. Chicago. The John McCormick Institute for Infectious Diseases. \$5.00 a year.

A new journal covering that section of medicine which holds that prevention is better than cure. Papers in the first number range from the inoculation of infants against tuberculosis to methods of preventing outbreaks of botulism.

THE CONVERSION OF COAL INTO OILS. By Dr. Franz Fisher. New York. D. Van Nostrand Co. \$8.00.

This is the only complete account in English of the remarkable researches on synthetic petroleum now being developed in Germany. Professor Fischer is coming to this country to attend the International Conference on Bituminous Coal at the Carnegie Institute of Technology, Pittsburgh, November 15-19, where he will tell of the work that has been done under his directorship at the Kaiser Wilhelm Institute for Coal Research at Muelheim-Ruhr.

BIRD'S EYE VIEW OF INVENTION. By A. Frederick Collins. New York. Thomas Y. Crowell Co. \$2.00.

An ambitious attempt to compress into 298 pages accounts of all the devices man has invented to make life easier since he first drove a stick in the ground to measure time by the shadow. A useful reference book covering a complex range of subjects written in simple understandable language.

GRANDMA'S GAME OF KNOTS AND WHYS OF SCIENCE. By Emma M. Griebel. Springfield, Mass. Milton Bradley Co.

A game of questions and answers pertaining to every day applications of elementary principles of physics and chemistry.

In 1717 snow fell to a depth of 10 to 20 feet in New England.

There can be no life on the moon, because it lacks moisture and air.

Teachers, Professors, Librarians, Club Leaders:

6c. a Week

(\$2.25 for school year, October through June; \$3.00 for calendar year)

is the special price of quantity subscriptions to

THE SCIENCE NEWS-LETTER

when ordered by colleges, schools, libraries and clubs.

The SCIENCE NEWS-LETTER is a living text-book that will vitalize science study. Each week it will bring to your classes a summary of the organized science knowledge of the world. Every field of science is covered. No book can do it. For the price of ONE text-book you can obtain in the NEWS-LETTER matter that would fill FIVE large books.

During the past four years hundreds of copies have been used in science classes throughout the country. (Note the study helps for each science on page 98.)

Orders must be for ten copies or more to go to one address.

(Single subscriptions are \$5.00 a year, 10 cents a week.)



SCIENCE SERVICE
21st and B Sts.,
Washington, D. C.

For the enclosed \$_____ please enter in my name _____ subscriptions

_____ school year

for

_____ year

beginning with issue of _____

_____ weeks

Name _____ Street _____

City _____ State _____

Anniversaries of Science

November 18, 1883.—Standard time substituted for local time in the United States and Canada.

Under the zone system, the same time is adopted over the whole of the region on the earth comprised between two meridians of longitude . . . the time corresponding to that of the central meridian of the zone. At the boundaries of the zone the time changes abruptly by one hour. . . . Thus the same time is used over a wide area, but this time never differs by more than 30 minutes from local time.

—Jones: *General Astronomy*.

The march of time is so important in human affairs that very great attention has always been given to it. By general consent, the unit of time is the day. Yet here trouble begins. If we should define the day as the time elapsing between the successive instants when the sun stands in the central north and south line of the heavens, which we call the meridian, an accurate clock would soon show that the days so defined are unequal. . . . Despite the inequality of apparent days, as measured by the sun's place in the sky, we must prefer solar time to stellar time because all our concerns are controlled by sunlight. It would be highly inconvenient to have to shift the hours of all business steadily throughout the year to make them suit the sun's position.

—Abbot: *The Earth and the Stars*.

November 20, 1852.—Last appearance of Biela's comet, which had a period of between six and seven years. It seems to have broken up into the Andromid meteors, which have the same orbit and the same period of recurrence that it had.

Biela's comet, discovered February 27, 1826, had a period of between six and seven years. It also was traced back into the eighteenth century. It returned several times, as predicted, but in 1845, after presenting first a pear-shaped form, it divided into two comets which gradually separated, thus perhaps showing in miniature the history of the earth and moon. On the return in 1852 the double form was recognizable, but the companions were over 1,200,000 miles apart. Both vanished shortly after their discovery, and have never been seen since.

—Abbot: *The Earth and the Stars*.

November 24, 1859.—Publication of Darwin's *Origin of Species*. The whole edition of 1,250 copies was exhausted the same day.

I am fully convinced that species are not immutable; but that those belonging to what are called the same genera are lineal descendants of some other and generally extinct species, in the same manner as the acknowledged varieties of any one species are the descendants of that species. Furthermore, I am convinced that Natural Selection has been the most important, but not the exclusive, means of modification. . . .

Whatever the cause may be of each slight difference between the offspring and their parents—and a cause for each must exist—we have reason to believe that it is the

steady accumulation of beneficial differences which has given rise to all the more important modifications of structure in relation to the habits of each species.

—Darwin: *Origin of Species*.

Science News-Letter, November 13, 1926

ASTRONOMY

Two Comets In One Day

Discovery of a new comet the same day as the rediscovery of an old one by the man who originally found it was the astronomical record hung up by European astronomers on Friday, November 5, according to Dr. Harlow Shapley. Dr. Shapley is director of the Harvard College Observatory at Cambridge, Mass., which acts as a clearing house for news of astronomical discoveries.

The new comet was picked up by Dr. J. Comas-Sola, director of the Fabra Observatory at Barcelona, Spain, and, following the usual practice, will become known to astronomers as Comas-Sola's comet. When discovered, early in the morning of Friday, November 5, by Spanish time, and Thursday evening according to American time, it was in the constellation of Cetus, the Whale, which can be seen in the southeastern sky about 9:00 p.m. Its exact position at that time, expressed in the astronomical equivalent of latitude and longitude, was 2 hours 56 minutes 36 seconds right ascension, and 6 degrees 31 minutes north declination. It was moving to the southwest, but as it is of the 12th magnitude, a good sized telescope is now required to see it.

Neujmin's comet was the celestial visitor which returned, and was picked up, also on Friday morning, by Dr. G. Neujmin, at the observatory at Simeis, Russia. Dr. Neujmin originally found this comet on February 24, 1916, and calculated that its orbit would bring it back every five and a half years. On November 16, 1920, he photographed a strange celestial object which is believed to have been his comet, but as sufficient observations to accurately determine its orbit were not obtained, this is not certain.

When rediscovered on this trip, Neujmin's comet was in the constellation of Leo, the Lion, near the handle of the familiar "Sickle," which can now be seen in the eastern sky for a few hours before sunrise. Its position was 10 hours 10 minutes 56 seconds right ascension and 18 degrees 29 minutes north declination. It is even fainter than Comas-Sola's comet, as it was of the 14th magnitude. It is not expected to become very much brighter.

Science News-Letter, November 13, 1926

Memory Rime

The Value of Pi

This is a variation on the memory rime published in the *SCIENCE NEWS-LETTER* (October 9) for remembering the value of Pi to 30 places of decimals. The number of letters in each word is the same as the corresponding digit in the value of Pi:

Sir, I send a rhyme excelling
3 1 4 1 5 9
In sacred truth and rigid spelling
2 6 5 3 5 9
Numerical sprites elucidate
9 7 9
For me, the lesson's dull weight.
3 2 3 8 4 6
If Nature gain,
2 6 4
Not you complain
3 3 8
Tho Dr. Johnson fulminate.
3 2 7 9

—Denham Larrett: *The Story of Mathematics*.

A French sentence for remembering the value to ten places has been suggested by the Rev. F. A. Tondorf, S.J., of Georgetown University:

Que j'aime à faire apprendre le nombre
3 1 4 1 5 9 2 6
utile aux sages.
5 3 5

Science News-Letter, November 13, 1926

MEDICINE

Smallpox This Year

Smallpox had more than its average potent killing power in 18 states and several of the Canadian provinces in the first half of this year. If the same proportion of deaths had occurred throughout the country that prevailed in the single state of Arizona, 7,700 lives would have been lost of the total 20,561 cases that occurred in this country in the six-month period.

From surveys of Metropolitan Life Insurance statistics it is evident that the large numbers of unvaccinated persons both here and in Canada provide ample material for a smallpox situation that may at any time lead to catastrophe. Prevention of the disease by vaccination and revaccination is declared to be of vital importance to both countries.

Science News-Letter, November 13, 1926

The Greek philosopher, Aristotle, taught that the world was composed of four elements—earth, air, fire and water—and that the sun and other heavenly bodies were made of a fifth element more perfect than the substances found in our world.



A Fifty-two Part Gift

SEND THE

Science News-Letter

— AS A —

Christmas Remembrance

Suitable for

Your father or mother
Your young relatives in school
Your school teacher friends
Your lawyer
Your minister
And any intimates of yours in whom the wish to keep step with the
newer things of science is a paramount issue.

The Science News-Letter is a **personal** publication. We plan it so that it will always keep its friendly appeal.

The field of science is a broad one. Knowledge of new discoveries and inventions should be the possession of every thinking man and woman. Give to your friends who do not know its charm and reliable information a chance to know, as **you** do, the wonders in this world of ours.

We shall send to each of the recipients of your generosity an artistic Christmas card delightfully designed and worded. This card will contain your name, as the giver, of the Science News-Letter for the period of one year.

OUR HOLIDAY OFFER

1 gift subscription	\$5.00
2 gift subscriptions	9.00
5 gift subscriptions	21.25

SCIENCE SERVICE,
Publishers of the SCIENCE NEWS-LETTER
21st and B Sts., N. W.
Washington, D. C.

My name and address is _____

and I enclose \$_____ for which please send THE SCIENCE NEWS-LETTER for one year to the names and addresses below. Send special Christmas card notifying them of my gift. (Cross out last sentence if you prefer to notify them yourself.)

NAME _____ NAME _____

ADDRESS _____ ADDRESS _____

